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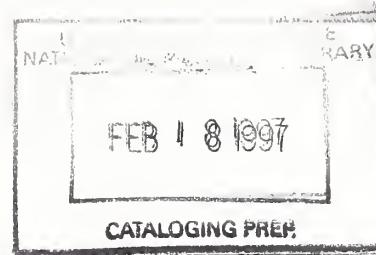
# National Food Safety Agenda

An APHIS Perspective

United States  
Department of  
Agriculture



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## National Food Safety Agenda: An Overview

Supplying the American public with food involves many participants and several different systems that are linked together in a complex chain extending from farm to harvest or slaughter to processing plant to table. Contamination of our meat, poultry, eggs, and dairy products can occur at any link in this chain. The winter 1992–93 outbreak of the *Escherichia coli* 0157:H7 (*E. coli*) infection in the Western United States focused national attention on the vulnerability of this chain to disease-causing pathogens.

Verotoxin-producing *E. coli* is just one of many foodborne pathogens causing illness in people in the United States today. Even the most optimistic estimates of illness resulting from food contamination reflect the need for improved food safety in this country. The economy suffers an estimated \$7.7 billion to \$8.4 billion in annual losses because of the costs of diagnosis, treatment, lost productivity, and death associated with food contamination (Bean and Griffin 1990).

The U.S. Department of Agriculture (USDA) currently protects consumers against foodborne pathogens by testing for drug and pesticide residues and by inspecting livestock in federally inspected slaughter plants for infections caused by micro-organisms. However, this system has weaknesses. Micro-organisms that can cause sickness in humans cannot be detected visually.

Animals are susceptible to infection or contamination with chemical and biological pathogens. Such exposure can take place on the farm, during transport, or at the market on the way to slaughter. Intensified food-animal production systems may increase the risks of such exposure.

These animal production and meat inspection factors, coupled with consumers' increasing concern about the quality, safety, and nutritional value of their food, have confirmed the need for a better integrated government–industry system that will enhance the safety of our food supply.

To accomplish this, USDA is designing a farm-to-table food safety strategy that will provide a way to minimize pathogen contamination throughout the food production process.

Such a strategy will systematize food safety by creating a process in which USDA looks carefully at the risks at each critical point in the food production process. And once the risks are identified, we can begin reducing or eliminating them in a scientifically sound manner.

The benefits of implementing a more comprehensive national food safety program are many. Such a program will focus on the prevention of human foodborne illnesses through reduction of biological and chemical contamination on the farm, during processing and distribution, and during food preparation, thereby reducing the losses associated with foodborne illnesses and increasing the value of U.S. food products.

Four principal outcomes flow from a coordinated national food safety program.

First, a safer food supply will significantly reduce the incidence of foodborne illness and the economic losses connected with it. A safer food supply will also help meet the goals listed in the U.S. Department of Health and Human Services' "Healthy People 2000 National Health Promotion and Disease Prevention Objectives" (hereafter referred to as "Healthy People 2000"). These objectives aim at reducing infections caused by key foodborne pathogens such as *E. coli* and *Salmonella enteritidis* (SE).

Second, safer food leads directly to improved consumer confidence. If USDA can assist agricultural producers in growing, harvesting, and manufacturing even safer foods, consumer confidence in the food supply will ultimately be strengthened.

Third, higher food safety standards will give U.S. producers a decided advantage in securing competitive international markets.

Finally, practices that improve the safety of food animal products also will benefit animal health and production efficiency.

## A Coordinated Effort

The U.S. food chain begins on the farm. From there, animals are transported to markets and then to slaughtering plants. These links compose the preharvest portion of our food chain. A recent report from the Centers for Disease Control and Prevention (CDCP) concluded that most pathogens appear to enter the food chain before animals arrive at processing plants.

The preharvest portion in the food chain is indeed critical. The Animal and Plant Health Inspection Service (APHIS) has accepted the challenge of providing leadership in preharvest pathogen reduction because we believe we can help reduce microbiological pathogens and chemical contamination in this portion of the food chain. But APHIS' role in preharvest pathogen reduction must be viewed within the context of a larger, national food safety agenda in which other agencies have primary responsibility. We will coordinate our pathogen-reduction activities with those allied regulatory agencies to ensure a governmentwide team approach to food safety programs.

### A Governmentwide Approach

USDA has committed to establishing a Pathogen Reduction Task Force to coordinate efforts to reduce pathogens in meat and poultry. This task force will be chaired by the Deputy Assistant Secretary for Marketing and Inspection Services. Membership will include the Administrators from APHIS, the Agricultural Marketing Service (AMS), the Food Safety and Inspection Service (FSIS), the Packers and Stockyards Administration (P&SA), the Extension Service (ES), the Agricultural Research Service (ARS), and the Cooperative State Research Service (CSRS). In addition, officials from the U.S. Department of Health and Human Services' Food and Drug Administration (FDA) and CDCP, which oversee certain segments of the food chain, will participate in the task force.

The task force is responsible for providing leadership, coordination, and oversight so that the Department's ongoing efforts to reduce pathogens in the meat and poultry supply are realized in a timely, professional, and scientifically supportable manner. The activities of the pathogen-reduction program can be divided into three broad areas: preharvest, harvest processing, and information and consumer services. The preharvest area consists of projects dealing with on-the-farm, transport, and market critical control points. Harvest processing includes slaughter and processing activities. The information and consumer services area is made up of sales, food service, and consumer critical control points.

Within the USDA task force, APHIS will lead the preharvest area and FSIS will lead both the postharvest and information and consumer services areas. While the focus of these efforts centers on pathogen reduction, the same team and coordinated actions will consider the reduction of chemical contaminants as well.

As a first step, the task force will thoroughly review the proposed pathogen reduction program to provide refinements and further suggestions about projects that will contribute to the overall goal. The task force will be responsible for the development of plans, evaluation of progress, program adjustments, and leadership and will function as an intergovernmental team, using innovative and creative strategies to achieve the program's mission.

## **APHIS Involvement in the National Food Safety Agenda: Preharvest Pathogen-Reduction Activities**

APHIS is advantageously situated to assume a leadership role in preharvest food safety because many critical points in food safety occur at precisely those points where our Veterinary Services (VS) personnel already conduct animal health surveillance, disease control, and eradication missions. Such VS activities are occurring on the farm, in transport, and at livestock markets and auctions.

The VS field force consists of veterinarians and animal health technicians with experience in livestock identification, animal movement, disease investigation, monitoring and surveillance, epidemiology, preventive medicine, and public health.

Our APHIS VS Centers for Epidemiology and Animal Health (CEAH) maintain a cadre of analytical epidemiologists, economists, statisticians, and computer specialists who can support the field operations in the design and implementation of large-scale epidemiologic projects that are national in scope.

In addition, our APHIS VS National Veterinary Services Laboratories (NVSL) provide disease diagnostic services and play a pivotal role in conducting applied research and developing diagnostic tests for emerging diseases.

Finally, APHIS VS headquarters staff provides an umbrella function by maintaining liaison with the Nation's commodity groups, coordinating projects of intra- and interagency scope, resolving policy and regulatory issues, providing technical expertise, and managing national disease programs.

## **Industry Involvement**

While APHIS can use its many assets to help ensure a safer preharvest food-production process, food safety will continue to be a responsibility shared by all participants in the food chain. The successful implementation of a national food safety program depends on coordination between Federal and State agencies, the food industries, and consumers. Producers obviously play a critical part in this effort.

Preharvest food safety may not necessarily require additional regulations. It will, however, require agricultural industries to take a more responsible and proactive role in reducing microbiological and chemical contamination. Together, industry and government can develop onfarm techniques to accomplish better decisionmaking and safer production practices.

A number of industry-sponsored quality-assurance programs already contribute to a safer food supply. Examples include the Milk and Dairy Beef Quality Assurance Program, a ten-point grassroots education effort by the National Milk Producers Federation and the American Veterinary Medical Association; pork and beef quality-assurance programs developed by the National Pork Producers Council and the National Cattlemen's Association; the American Veal Association's quality-assurance program; the "good manufacturing practice" guidelines developed by the National Broiler Council and several quality-assurance efforts by the United Egg Producers; the chemical-residue avoidance program of the National Turkey Federation; and the flock health-certification program of the American Sheep Industry Association. All these

programs focus on actions that individual producers can take to improve the quality and safety of the products they market. These programs provide the foundation for building future preharvest food-safety initiatives.

There also is great potential for creativity in this area. Producers can take advantage of research that develops ways to enhance the resistance of food-producing animals and minimize their exposure to chemical and biological pathogens. In addition, innovations in biotechnology may provide producers with new approaches to producing better products that have more resistance to infectious agents.

## **APHIS' Core Strengths and Services**

This document identifies the services VS currently provides and the APHIS strengths that we believe can be useful in a national food safety initiative. We are requesting input from our Federal, State, and local cooperators to help us identify specific ways to use our capabilities in working together to ensure the safety of animal-derived food products.

The following section includes detailed descriptions of three APHIS core strengths and eight disease-management services provided in our current animal health programs that can be used to implement preharvest pathogen-reduction initiatives.

For each core strength and service, we explain the activities APHIS currently performs and, for the service areas, explore how these can be expanded under blueprints for action.

A table on page 18 indicates APHIS services in the food chain and when the services can be implemented for food safety activities.

### **Core Strengths**

Three core strengths in APHIS' Veterinary Services form the its preharvest food-safety activities.

#### ***Epidemiologic Delivery System***

Epidemiology is the branch of medicine concerned with investigating causes and controls of epidemics in a population. VS has in place an epidemiologic delivery system that is used to collect, analyze, and disseminate information on diseases, diagnostic data, and surveillance efforts.

A National Food Safety Agenda requires the existing infrastructure to be further developed so that a full spectrum of food-safety-related services can be provided. Such services include disease monitoring and surveillance, traceback capabilities, outbreak and hazard investigation, animal identification, risk assessment, economic analyses, research and development, communication and education, and risk management.

To provide for strategic and operational preharvest food-safety planning, we are establishing a Food Safety Management Team within APHIS led by a full-time staff officer. The team will consist of a staff member for each commodity staff group, one for each laboratory discipline involved in diagnosis of foodborne diseases, one for the epidemiology centers, and one for the epidemiology field staff. This team will interact with APHIS cooperators (e.g., FSIS, AMS, producers, packers, and market personnel) to determine specific activities APHIS will conduct in implementing its preharvest pathogen-reduction activities.

The team will identify resources needed for national preharvest surveillance and monitoring, risk assessment, economic analyses, and identification of hazards on the farm, in transport, and at the market. It also will coordinate all VS monitoring and surveillance activities, including banking of diagnostic specimens.

As a part of this effort, each State will establish multidisciplinary food-safety teams representing both government and industry. Included on the teams will be representatives from APHIS, FSIS, AMS, FDA, State counterparts and cooperators, university faculty, State diagnostic laboratories, producers, private veterinarians, and extension agents. The purpose of the teams will be to begin communication, education, and planning among participants and to identify their respective roles and responsibilities.

As our agenda takes hold and resources are identified, the team will become a full-time permanent staff function.

### ***Information Technology Management***

Managing the U.S. food safety continuum will require the use of advanced information technology equipment coordinated among all participants.

Information systems used by State and Federal governments, packers, producers, marketers, and diagnostic laboratories must coordinate data on animal identification, farm location, microbiological and chemical agent identifications, quality assurance programs, and herd certifications to provide consumers and producers with current and integrated food safety information.

Improved information sharing through a national information technology management strategy will enhance programs in disease prevention, investigation, and control. It will help producers attain the level of quality assurance that is important so the products of American animal agriculture can continue to compete in a global market.

A coordinated USDA system will eliminate duplication of data and therefore help conserve resources.

APHIS and State cooperators have substantial experience in establishing large database programs to monitor and track animal disease eradication programs. APHIS has a cadre of computer professionals who are qualified to lead such an initiative.

There is a critical need to collect, analyze, and disseminate preharvest food-safety information in order to identify critical control points in production. It is essential that we learn more about how these preharvest factors influence disease prevention. The information learned from studying individual premises must then be distributed throughout the industry. APHIS is qualified to assume an important role in this area.

### ***Diagnostic Laboratory Participation and Support***

Identifying animals that harbor agents of potential health risk to humans requires sensitive and specific laboratory diagnostic procedures. The laboratories at NVSL have these capabilities, and their services can be expanded to provide an extensive foodborne pathogen and residue surveillance system. This arm of APHIS serves as the national animal-disease diagnostic reference laboratory and is a multidisciplinary advisory and technical resource for state-of-the-art diagnostic activities.

NVSL's professional staff is proficient in the diagnostic disciplines of pathology, microbiology, virology, immunology, chemistry, toxicology, parasitology, and molecular biology. This staff provides diagnostic support and technical expertise for APHIS disease-eradication programs. It lends diagnostic reference assistance, produces diagnostic reagents, and provides professional consultation to State-funded animal diagnostic laboratories. NVSL also collaborate with CDCP, ARS, and research laboratories of universities and commercial industries.

In carrying out these responsibilities, NVSL provide data on pathogens responsible for causing foodborne illnesses in humans. The laboratories have the capability to assist the network of State-funded diagnostic laboratories with quality-assurance testing.

Many of the State laboratories are interconnected through a computerized reporting mechanism. APHIS can monitor the health of the animal agriculture community nationwide through this system.

#### **APHIS Services**

As USDA enters its second 100 years of promoting animal health, it can look to APHIS to build on the successful disease eradication programs of the past. The knowledge we have gained and our relationships with industry provide a base from which we can address the public-health implications of food animal production. The SE program is a good example of how industry and government can work together to address preharvest issues of public-health concern.

#### ***Animal Identification***

APHIS has in place a system for animal identification so that diseased or exposed animals or those suspected of having certain infectious diseases can be traced back to their premises of origin. The system uses identification devices such as eartags and backtags that are attached to animals in interstate commerce.

Because animal identification provides the link to the premises of origin, it will be critical in the implementation of a National Food Safety Agenda. This link can be used to identify animals and animal products that are contaminated with biological or chemical pathogens.

#### ***Blueprint for the Future***

- In conjunction with industry, evaluate available electronic methods for entering and tracking animal identification information and establish the data bases and protocols for storing this information.
- Develop a national identification program for all livestock to facilitate accurate and timely tracebacks. This program will involve working with industry representatives to develop an identification and recordkeeping system for premises of origin. Such a system must generate fast and accurate identification concerning the producer's animals and may lead to the awarding of quality incentives at slaughter. This system will promote consumer confidence and producer accountability.

- Identify ways to supplement APHIS' current traceback systems to increase speed and accuracy of tracebacks.
- Implement a multidisciplinary team approach to find an animal identification solution to the problems that FSIS has identified with cull dairy cows, injured cows, and veal calves.
- Establish APHIS as the national traceback linkage for all Federal food safety agencies.

### ***Monitoring and Surveillance***

APHIS has conducted animal-health monitoring and surveillance activities throughout the country for several years, and the success of many prior disease eradication programs can be largely attributed to these activities. More recently, VS' National Animal Health Monitoring System (NAHMS)—begun in the early 1980's—has provided us with more accurate and more complete information on the incidence and prevalence of various diseases and disease conditions. Dairy heifer, swine, and beef cow surveys are but three of the large-scale monitoring and surveillance initiatives NAHMS is conducting.

Currently, the data collected at NVSL and through cooperative efforts with States, industry, and universities are used in epidemiologic studies to determine the prevalence and distribution of diseases of economic and human health significance. We also use these data to develop future animal health strategies. Data collected through monitoring and surveillance activities are distributed to animal health professionals and industry representatives through CEAH. A separate line-item budget for this activity creates added flexibility to respond to and study outbreaks of foodborne illnesses.

### ***Blueprint for the Future***

- Provide input, via the APHIS Food Safety Management Team, into the development of programs to identify and monitor agents of food-animal origin implicated in outbreaks of human disease.
- Monitor slaughter surveillance test results provided to State and Federal field personnel to obtain data on contaminants identified at slaughter. This process can be the key to establishing baseline studies and occurrences of potential pathogens.
- Expand APHIS surveys to address additional food safety concerns of the poultry and feedlot-cattle industries and to generate national prevalence estimates of specific foodborne pathogens of animal origin.
- Via industry quality-assurance programs in herds and flocks, develop programs that can be used to certify animals and products from such herds for export and provide other marketing advantages to the producer.

- Promote quality assurance on the farm to minimize the amount of retesting required at slaughter. Assist producers with laboratory support for verification of their quality assurance efforts.
- Use epidemiologic methods to evaluate alternative sampling approaches and diagnostic technologies to support monitoring and surveillance initiatives.
- Design and implement prevalence and incidence studies of targeted pathogens and other potential food contaminants. These studies will originate at slaughter plants and on the farm, and will help identify data gaps.
- Determine which kinds of animals are most likely to carry disease agents or other food contaminants and focus sampling efforts on these species.
- Design case-control studies to determine risk factors that will help identify those farms likely to experience specific types of food contamination. Implement monitoring and intervention strategies for those farms.
- Develop reporting and data-entry mechanisms to identify livestock and poultry operations (using geographic coordinates) for various parameters, such as quality assurance and participation in disease certification programs, quarantines, and diagnostic testing data.
- Create a simple, easy-to-use, automated record and information system to handle the data from surveillance activities at the local and national levels.
- Coordinate VS monitoring and surveillance activities, including banking of diagnostic specimens.

#### ***Outbreak and Hazard Investigation***

When outbreaks of animal diseases occur, APHIS has the expertise to respond immediately by conducting epidemiologic investigations, laboratory tests, and animal tracebacks; by identifying critical control point failures; by evaluating solution options; and by implementing a control, reduction, or eradication plan. We can use these same skills to investigate food safety problems of animal origin and learn how to respond to them. In addition, our emergency response capabilities can be expanded through enhanced cooperative efforts with other government agencies.

#### ***Blueprint for the Future***

- Secure statutory authority to assist FDA and FSIS in conducting tracebacks and onfarm investigations of contaminated food of animal origin. Then expand epidemiologic surveys to include food safety concerns along with animal health issues.
- Establish APHIS procedures for investigating potential foodborne pathogens on the farm.

- Enhance the VS field staff's capability to conduct traceback and onfarm biologic and chemical hazard investigations by training personnel in rapid epidemiologic assessment techniques.
- Integrate disease outbreak investigations into ongoing food safety programs. Collect baseline data for control farms while completing disease outbreak investigations.
- Identify data gaps that limit epidemiologic analyses of the five key foodborne disease agents identified in "Healthy People 2000."
- Establish clear goals and procedures so that information that is collected and analyzed can be used to promote quality assurance and risk management.

### ***Risk Assessment***

Improving food safety requires that we measure the risk of animal-derived pathogens entering each stage of production, from the farm to the table. Methodologies exist to quantify the magnitude of these risks.

Risk assessment involves three steps: identifying the hazards, estimating the likelihood of the hazard occurring, and evaluating the event's impact should it occur.

Timely and accurate risk assessments will enhance VS' capability to respond to real versus perceived food safety concerns. The hazard analysis critical control point (HACCP) approach, currently used at slaughter and in the food-service industry, can be expanded to identify critical control points within the entire food safety chain.

Using risk assessment techniques and a critical control point approach will make it possible to create strategies to reduce the overall risk to the consumer.

The process of risk assessment is already incorporated in the APHIS decisionmaking process concerning import-export matters, program implementation, and identification of emerging issues. For example, risk assessment was used in responding to SE by calculating the potential for human exposure to SE through egg consumption. APHIS has also used risk assessment to evaluate the potential for an epidemic of bovine spongiform encephalopathy in this country.

### ***Blueprint for the Future***

- Conduct risk assessments on the five key foodborne pathogens of animal origin identified in "Healthy People 2000."
- Conduct epidemiologic studies designed to identify risk factors for *E. coli* and SE and the critical points in the food chain where these organisms can enter, with special emphasis on the preharvest portion of the chain.

- Broaden risk assessments and hazard analyses to include other potential foodborne pathogens of animal origin, and expand hazard analysis models to allow various risk management and prevention alternatives to be evaluated.
- Initiate studies of risk factors to support the development of voluntary food-safety certification programs by commodity groups.
- Evaluate the human health risks that may be associated with emerging animal diseases, such as bovine spongiform encephalopathy, or diseases affecting new animal populations, such as bovine tuberculosis in Cervidae.
- Augment APHIS' risk-assessment and hazard-analysis capabilities through recruitment and training of multidisciplinary teams.
- Begin forecasting potential changes in food safety risks that may result from changing human demographics and consumption patterns in association with changing animal demographics and production practices.

### ***Risk Management***

APHIS has a cadre of experienced professionals who can conduct disease, residue, or contaminant risk assessments, prepare cost–benefit analyses, or devise risk-avoidance and risk-management strategies. These strengths will enable the agency to intervene successfully in human foodborne outbreaks of animal origin. With special emphasis on zoonotic diseases, APHIS has successfully eradicated animal diseases from this country using risk-management techniques.

### ***Blueprint for the Future***

- Review current information available on the five key foodborne pathogens identified in “Healthy People 2000.” Cooperate with ARS, universities, and allied Federal agencies in conducting research on preharvest risk-management strategies for those pathogens.
- Establish an APHIS task force to determine the most advantageous preharvest risk-management strategies for a National Food Safety Agenda. Meet with each commodity group to determine their priorities for preharvest intervention for additional pathogens.
- Establish graduate training positions for the major commodity groups (swine, poultry, beef, dairy). The personnel in these new positions will be trained in the area of preharvest food safety. In time, they will be able to assist in the design of the necessary interventions to reduce the risk of human illness caused by farm-origin pathogens.
- Provide the field force with training in herd health management, quality assurance, and food safety issues that affect farm-production management, transportation, and marketing.

- With other agencies and universities, develop an integrated approach for the research, design, and pilot testing of intervention strategies. Determine, through a review of available data, if preharvest is the most appropriate position in the food safety continuum for initiation of pilot intervention strategies for the most common microbiological contaminants.
- Continue to develop and implement SE intervention strategies for egg-laying flocks.
- Establish management strategies for minimizing pathogens from individual farms, thereby reducing the need for antibiotics that can enter the food chain.
- With the help of industry and consumers, structure voluntary national animal health schemes that focus on risk reduction and producer incentives. Reach agreements with industry officials to support programs that continue to move toward reducing the prevalence of a given pathogen.
- Form local, regional, and national partnerships with government, industry, and academia for conducting biological and chemical contaminant-awareness programs. These programs will monitor biological and chemical pathogens and establish acceptable risk baselines.

### ***Economic Analyses***

Historically, the economics of food safety initiatives have not always been established before launching new programs. With the tightening Federal budget and public concerns for a low-cost, safe, and abundant food supply, the importance of the economics of a food safety initiative has increased.

Economic analyses can not only characterize the potential costs of specific foodborne pathogens but also provide insights into alternative approaches for achieving a balance among animal health and welfare, food safety, production efficiency, and environmental quality.

Economic analyses are playing an increasingly important role in the APHIS decisionmaking process. Information gathered from economic analyses and risk assessments is used to construct effective risk management strategies. APHIS employs economists who are capable of conducting complex analyses. We will also coordinate efforts with economists from the Economic Research Service, ARS, FSIS, AMS, and universities in evaluating complex economic scenarios of national scope.

### ***Blueprint for the Future***

- Compile existing economic information concerning the five key foodborne pathogens of animal origin identified in "Healthy People 2000."

- Ascertain data needs for economic analyses of foodborne pathogens of animal origin. This includes evaluating the cost-effectiveness of potential intervention programs identified through the risk assessment process and measuring benefits that consumers and private industry will experience as a result of improvements in food safety.
- Expand economic data-collection systems to support analyses and risk management. Evaluate voluntary market incentives and potential participation levels of stakeholders with regard to various food safety initiatives, such as producer certification programs and quality assurance initiatives. Compare alternative approaches that reward producers for improvements in food safety while reducing the economic impacts of specific foodborne pathogens.
- Incorporate economic data into the prioritization of food safety issues of concern to APHIS and into the risk communication processes on food safety issues.

#### ***Communication and Education***

Working with USDA's Extension Service, the media, and other outlets, APHIS successfully provides information and training to States and industry on disease control and eradication programs. We can expand our existing infrastructure to provide essential communication and education in the preharvest arena and to coordinate a team effort among industry, State and Federal agencies, academia, and consumers.

Information derived from risk assessment, economic analyses, and research and development can be shared with these groups to educate them about biological and chemical pathogen control and safety strategies.

Education of field personnel in epidemiology has strengthened the APHIS infrastructure. These qualified professionals not only provide an effective and responsive epidemiologic delivery system, but can be a source of valuable food safety information at the grassroots level.

#### ***Blueprint for the Future***

- Form a task force to discuss information sharing and integration. Define the communication responsibilities for food safety issues for each unit in the food chain, e.g., Federal agencies, industries, and consumers.
- Establish and communicate APHIS food safety priorities to all participants in the epidemiologic delivery system. Enhance the education and training of the APHIS field force to prepare for epidemiologic support and traceback activities and to give individuals an understanding of emerging food safety issues. This project will focus initially on *E. coli* and SE and will define the roles of APHIS personnel in a food safety initiative.
- Disseminate results of the APHIS *E. coli* survey of dairy cattle to consumers, producers, and veterinary organizations.

- Provide intensive risk-communication training to APHIS personnel.
- Expand risk communication efforts concerning *E. coli* and SE. Target this to all participants in the farm-to-table food chain as well as to U.S. trading partners.
- In conjunction with the Extension Service, provide information to all participants in the food chain that results from our risk assessment activities and our economic analyses of key foodborne pathogens of animal origin. Our risk communication efforts will be focused at the preharvest level but will also include the balance of the food chain.
- Analyze risks and intervention strategies and transfer results of these analyses through educational programs for producers and their veterinary practitioners in support of herd-certification and quality-assurance programs. The focus of these educational efforts will be on preventing disease, rather than treating it. This will help producers make informed risk-reduction decisions.
- Establish an integrated APHIS-wide information network that maintains updates on food safety initiatives, risk assessments and hazard analyses, risk communication materials, and information on investigations and tracebacks of specific biological and chemical contaminants. This food-safety communication network—to include APHIS headquarters and fields staffs, CEAH, and NVSL—will provide electronic mail, access to program data, and specific information on biologic or chemical hazards being investigated.
- As a next step, link this APHIS information network with networks of CDCP and other agencies and groups interested in food safety. Through this expanded network, share risk-assessment information with all other interested animal and human health agencies.

### ***Research and Development***

Historically, a gap has existed between research findings and their practical application to animal health program needs. In cooperation with ARS and CSRS, APHIS works to fill this gap through methods development.

In the preharvest pathogen-reduction initiative, APHIS and all supporting research entities must learn to increase their coordination and implementation efforts. Because of the complexity of some issues, combined efforts of Federal, State, and university researchers will be required.

Research and development activities must be conducted to provide state-of-the-art methods for epidemiologic delivery, diagnostic technology, development of intervention strategies, and pathogen reduction.

APHIS can use its existing system to identify information gaps in the food safety continuum and to assist in designing research initiatives to fill these gaps. Information derived from tailored research initiatives can immediately be applied to real-world food safety problems.

### *Blueprint for the Future*

- Prioritize future research needs. These needs can be addressed within ARS and CSRS and by forming partnerships with university consortiums and biologics companies.
- Investigate technology currently available that will provide accurate diagnostic information for the top five pathogens listed in "Healthy People 2000" (*Salmonella* sp., *Campylobacter jejuni*, *E. coli*, *Listeria monocytogenes*, and SE). Prepare a plan to provide the technology for diagnosing these diseases. Such diagnostic technology must include tests with adequate sensitivity and specificity to differentiate pathogenic from nonpathogenic serotypes.
- Determine the methods of choice for testing food-producing animals for antibiotics, pesticides, and other contaminants. Standardize test methodologies with FSIS so that onfarm surveillance and at-slaughter test results can be correlated.
- Work with research laboratories and biologics companies to develop onfarm tests to help producers monitor their animals for chemical and biological pathogens. These tests can also serve as tools for APHIS' epidemiologic studies of zoonotic diseases.
- Determine the level of diagnostic services that will be needed to give full support to the National Food Safety Agenda. Determine the role of State-funded diagnostic laboratories in supporting program needs, and determine the cost to contract these services.
- Implement a plan to provide diagnostic tests for additional food pathogens beyond those listed in "Healthy People 2000." Identify the laboratory technology necessary to obtain the desired results for the specific food contaminant being studied. Focus on rapid, accurate test procedures that can be performed on live animals. Establish the sensitivity and specificity of these tests. Prioritize a list of disease agents for which there is no adequate diagnostic test according to their degree of hazard to the food supply. Provide information and reference micro-organisms to ARS, universities, and commercial firms for research to develop identification tests.
- Coordinate a national network of animal disease diagnostic laboratories participating in a national food monitoring and surveillance program. Integrate the diagnostic reporting system, and promote standardized diagnostic methods for all participating laboratories.
- Let NVSL serve as a national reference laboratory by providing standardized procedures for investigating farms suspected of being sources of human illness caused by chemical contamination. Expand proficiency testing for State-funded diagnostic laboratories to help standardize the diagnostic laboratory network that supports the National Food Safety Agenda.
- Develop and implement molecular biological techniques to help evaluate the source of foodborne outbreaks and to differentiate the pathogenic micro-organism strains from those not associated with human disease.

## **Summary**

APHIS' objective in the National Food Safety Agenda initiative is to reduce the incidence of foodborne illness, improve consumer confidence, and improve animal health and production by focusing on the preharvest segment of the food chain. Emphasis will be placed on shared responsibility between government and industry.

Cost–benefit analyses must be conducted to ensure that interventions are implemented at the most-effective critical control points and that both producers and consumers are receiving the maximum benefit from expended resources.

Because APHIS has an existing infrastructure and a successful track record in identifying and controlling infectious diseases of livestock, additional resources required to accomplish pathogen-reduction programs can be held to a minimum. With our current infrastructure, APHIS will be an active partner with the private sector and with other Federal and State agencies that have food-safety and quality-assurance responsibilities.

Increased levels of funding will allow more-active implementation of a National Food Safety Agenda by incorporating developmental projects that will help define the long-term goals of the initiative. Working in conjunction with FSIS, ES, and universities, APHIS can conduct training courses in food safety and assume a leadership role in preharvest issues in partnership with other public and private agencies.

We will be able to monitor food safety concerns and prioritize issues for further intervention.

We will be able to cooperate actively with FSIS, ES, public health officials, and veterinary practitioners to trace back and investigate foodborne disease outbreaks where animal pathogens are implicated.

We will expand diagnostic testing for potential foodborne pathogens using samples generated by existing monitoring and surveillance programs.

Funding will allow for the design of an identification and recordkeeping system that will enhance identification of premises of origin.

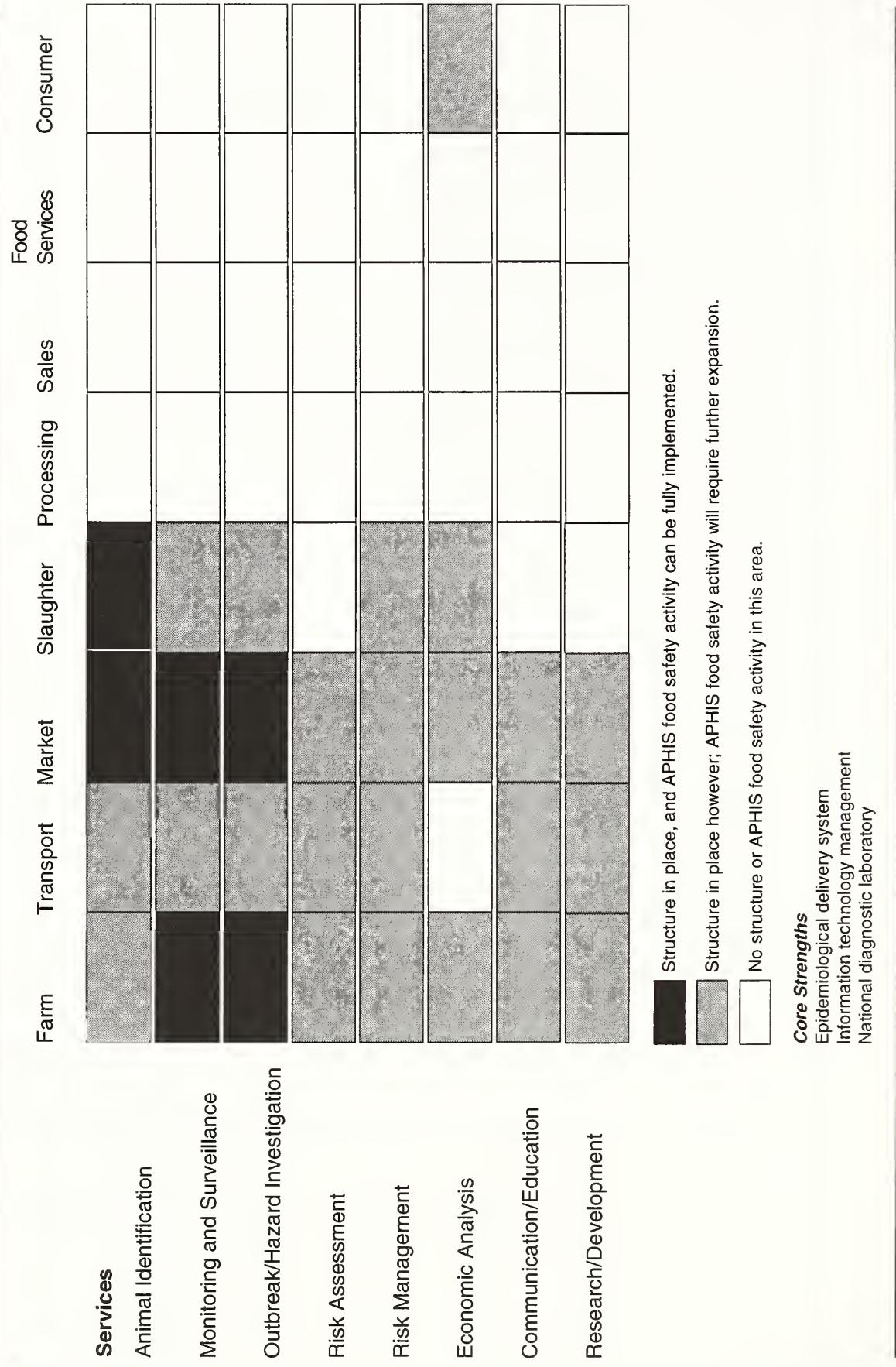
A food safety hotline between APHIS, other food safety agencies, and States will be established.

We will expand our monitoring and surveillance capabilities to include additional microbiological and chemical agents of concern.

We also will expand our risk assessment expertise to identify problems of greatest human-health concern and coordinate the development of intervention strategies to reduce risk to the consumer.

Additional resources will be required to carry out foodborne outbreak investigations. Additional resources will also be needed to develop diagnostic tests for antibiotics, mycotoxins, and other chemical agents and to provide check tests and training opportunities for State laboratories.

The following chart depicts core strengths and services provided by APHIS as they relate to the farm-to-table food safety continuum.



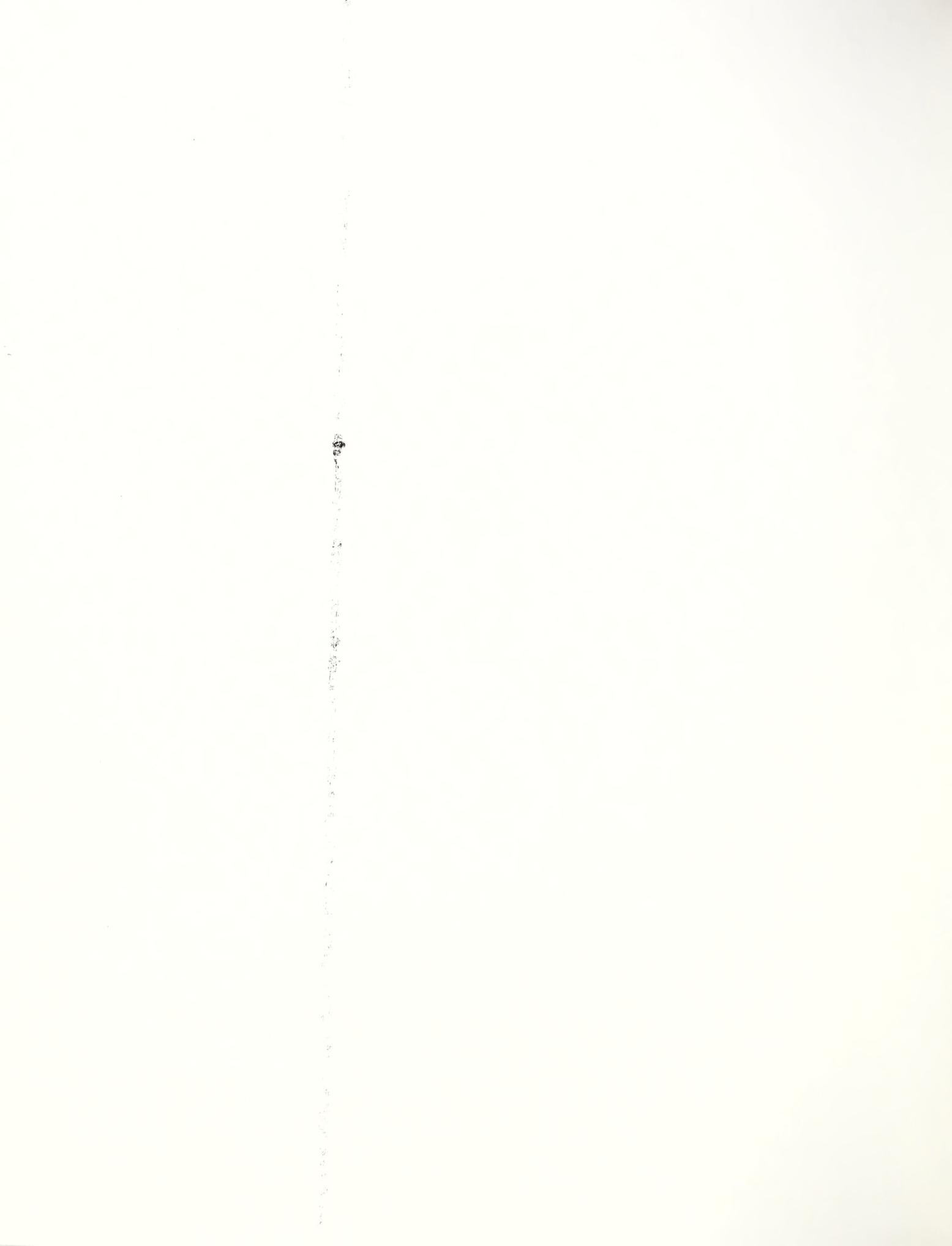
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